Removal of an embedded crochet needle in the mouth

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A 3-year-old child presented to the emergency department with a crochet needle lodged in her posterior oral cavity. To localize the needle and significant surrounding anatomic structures, bedside transcavitary ultrasound was employed. After careful localization, the needle was removed using a modified needle cover technique. A review of barbed foreign object removal techniques, including advance-and-cut, retrograde, string-yank, and needle cover techniques, is presented. Important considerations while planning any procedure include risk, benefit, availability of staff, and availability of equipment. Proper anesthesia is paramount to the success of these procedures, and sedation in pediatric patients may prove necessary. Postprocedure wound care and follow-up must also be arranged. This case demonstrates the importance of adaptation of well-documented techniques to remain flexible for any situation that may present to the emergency department.

The removal of barbed foreign objects presents a particular challenge in the emergency department. Most publications regarding this topic discuss the removal of fish hooks. Less discussed are methods for removal of other types of barbed objects, including sewing needles and aquatic animal spines. This report describes barbed foreign object removal using bedside ultrasound and a modified technical approach.

CASE REPORT

A 3-year-old girl presented to a children's emergency department for foreign body removal. The patient was running with a crochet needle in her mouth when she fell forward. The needle went into her mouth and became lodged (*Figure 1*). Upon arrival, the child was crying and anxious. She had no respiratory distress or hemodynamic instability, and her vital signs were normal. Examination of the mouth revealed intact dentition and midline uvula. An acrylic crochet needle was penetrating the left buccal mucosa just lateral to the pterygomandibular raphe. No hemorrhage or hematoma was noted.

In an attempt to define the track of the needle, a computed tomography scan was performed, but proved not to be helpful as the needle was the same density as the soft tissue (*Figure 2*). Transcavitary ultrasound under sedation revealed shadowing at the end of the crochet needle (*Figure 3*). This allowed for measurement to determine the depth of the needle, and using

Figure 1. Modeled image of a crochet needle embedded in a child's mouth.

the Doppler feature of the ultrasound, we were able to ensure that no vascular structures were involved. This suggested that safe removal in the emergency department was possible.

DISCUSSION

With any foreign body removal in the emergency department, an important initial step in evaluation is localization. This allows the physician to determine the need for involvement of surgical subspecialties. In some instances, such as foreign bodies to the eye, the need for involvement of a subspecialist is more obvious (1–4). In this case, the decision had to be made regarding the safety of removing the needle in the emergency department versus removal in the operating room with an otolaryngologist.

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Figure 2. CT image showing the embedded crochet needle having a density similar to that of soft tissue, making localization difficult.

Four techniques for hooked or barbed foreign body removal are well described and are summarized and illustrated in the *Table* (5–9). These techniques are based upon hooked objects such as fish hooks that have a large gap between the shank and the barb. With the crochet needle, the gap was less than a centimeter, making the often successful advance-and-cut technique difficult. In this technique, a small incision is made over the location of the end of the foreign body, typically in anesthetized skin. The barb is then advanced through the remaining soft tissue. Once external to the skin, the shank is cut, and the remainder of the barb is backed out of the skin. This technique

Figure 3. Transcavitary ultrasound image displaying shadowing at the needle's tip. Ultrasound allowed for measurement of depth and localization of vessels using Doppler.

Table. Techniques for barbed foreign body removal

Technique	Description	Illustration
Retrograde	Apply downward pressure on the shank while simultaneously removing the hook in a retrograde fashion	
String-yank	Tie a string around the bend of the hook. Apply downward pressure to the shank while simultaneously applying strong, retrograde tension on the string	
Advance and cut	Advance the hook until the barb is external to the skin, cut the shaft, and remove the remainder of the hook in retrograde fashion	
Needle cover	Insert a large-gauge needle along the path of entry until reaching the barb, cover the barb with the lumen of the needle, and remove the barb and needle simultaneously in retrograde fashion	

is the most successful of the four described in fish hook removal, as it can be used on deeply embedded hooks; however, its utility is limited in barbed objects of other shapes (5, 7–9).

The less invasive retrograde technique was unsuccessful due to the inability to dislodge the barb. An inability to dislodge the barb is the limiting factor in this technique. In fact, this technique was shown to be successful in only 40% of fish hook removals (10). The percent of success with all barbed objects remains unknown.

The string-yank method, which is related to the retrograde technique but is less traumatic to soft tissues, was not possible due to the bend of the hook itself being lodged in the tissue. With this technique, the downward pressure used with the retrograde technique is applied to the shank. Simultaneously, a string is tied around the bend, and the object is pulled in a retrograde fashion. Limitations of this technique include lack of applicability to deeply embedded objects and the potential for secondary injury due to the projectile nature of the newly dislodged object (5, 7–9).

A modified needle cover technique proved successful. In most cases, a needle is inserted at the point of entry and traced along the bend of the hook. Once the barb is located, the lumen of the needle is slipped over the barb so that both the needle and hook may be removed simultaneously (5, 7–9). Since the

barb of the crochet needle was larger than a needle lumen, we inserted a needle driver into the entry site, traced the bend until the barb was encountered, covered the barb with the needle driver, dislodged the barb from the tissue, and removed the needle and needle driver simultaneously.

The patient was monitored for several hours, but no signs of hemorrhage or hematoma developed. A small 0.5 centimeter punctate lesion remained in her left buccal mucosa. The patient was discharged with follow-up with her pediatrician in 1 week.

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